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Wood and Veneers, Artificial Wood.—T. Forrest, 844.

A NEW METHOD OF MAKING GLASS SIGNS.

Mr. Henry A. Goetz, of New Albany, Ind., has patented through the Scientific American Patent Agency (January 2nd 1877) a new method of making gilt signs, etc., on glass. The usual mode of procedure consists in roughly painting the letters on one side of the glass; then on the opposite side the letters are carefully painted in gold size. On this the gold leaf is laid, and when the whole is dry the superfluous gilding is removed. The letters are then shaded by hand. Mr. Goetz' process is much more simple and expeditious. He begins by covering the glass where it is to be lettered with gold or silver leaf having previously applied a coating of isinglass size. Then a yellow, hard-drying ink is applied to the gilded surface with elastic type, in such places as are to retain the leaf. When this ink becomes thoroughly hard and dry, the surplus leaf is removed with whiting, applied with a damp pledget of cotton while the lettering is retained by the ink. The shading or its outline is now printed on the glass with elastic type, when this is dry hand work may be added if desired and all backed up as usual.

Reviews.

BOTANIC SCIENCE IN MELBOURNE.

"Annual Report on the Melbourne Botanic Gardens, Government House Grounds and Domain." By W. R. GUILFOYLE, F.L.S., C.M.R.B.S., London, Director. Melbourne: by Authority, John Ferres, Government Printer. 1876.

THE contents of this annual report will be found of much interest to all who have any regard for the practical progress of botany. Perhaps, however, most of our readers will be the best pleased with Mr. Guilfoyle's "Essay on the Fibres," forwarded to the Amsterdam International Horticultural Exhibition, from the Melbourne Botanic Gardens, in which he states that the collection comprised many fibres prepared from plants which have been hitherto considered as valueless, at least for this purpose, although a few were approved paper plants. Those specially worthy of note as being new, are, Cordyline cannæfolia and C. nutans, Juncus maritimus and J. vaginatus, Pandanus Fosterii, and P. pedunculatus, Poa australis (variety ten), Typha angustifolia, Xerotes longifolia, Lepidosperma gladiatum, Cassytha melantha, Carex appressa, Musa Banksii, and Dianellas elegans, cœrulea, longifolia, revoluta, and tasmanica from Australia; Cordyline pumilio and Astelia Banksii from New Zealand. From the samples of fibre shown on this occasion practical men (says Mr. Guilfoyle) will see that with proper machinery and other appliances, we can supply fibres not only suitable for coir-matting, ropes, and brush making, but also for fishing-nets and lines, and even for the most delicate textile fabrics. Our extensive geographical range too, and varied temperature of climate coupled with choice of soils and situation, afford immense scope for the successful growth of foreign fibre plants; thus while many parts of Victoria, are eminently adapted for the growth of the common Flax *(Linum usitatissimum)*, other districts will produce the Hemp *(Canabis sativa)*, the Jute *(Corchorus olitorius)*, the Rheea of India, better known as "the Chinese Grasscloth plant" *(Bœhmeria nivea)*, which grows here with great luxuriance, the Toddy Lily *(Agave americana*, commonly known as the American aloe), the Fibre or Giant Lily of S. America *(Fourcroya gigantea)*, the African Hemp *(Sparmannia Africana)*, which produces a superior fibre, the Adam's needle, and Dagger plant *(Yuccas gloriosa* and *aloefolia)*, the Dragon Tree *(Dracæna Draco)*, and a host of others too numerous to mention, from all of which fibres have been prepared under my supervision at the Melbourne Botanic Gardens.

Next to India, New Zealand (as far as at present known) is perhaps the richest of all countries in fibre-yielding plants. Commercially speaking, in her *Liliaceæ* alone a mine of wealth might be opened up; and it is a matter for surprise (considering the quantity and quality of the fibre of the many species of Cordyline with which her different islands abound, not to speak of the various trees from which bast of the most beautiful lace-like texture can be obtained) that a brisk trade has not sprung up in this direction ere now. Although the palm must be awarded to the New Zealand Flax *(Phormium tenax)* in point of fineness and adaptability in the manufacture of textile fabrics, &c.; yet when we come to consider the amount of labour necessary in preparing the fibre for market, in comparison with that required in the preparation of the Cordylines, the advantages would be almost counterbalanced.

This work shews the capabilities of Australia, and might be used as a powerful argument in favour of Colonial museums.

DR. BLACKLEY ON HAY-FEVER.

"New observation on Hay-Fever, with new experiments on the quantity of Ozone in the Atmosphere." By CHARLES H. BLACKLEY, M.D. (Bruss.), M.R.C.S. (Eng.) London: Baillière, Tindall, and Cox, 20, King William-street. Manchester: Tubbs and Brook, 11, Market-street, 1877.

THIS is a very valuable contribution to our knowledge of a subject which is of interest to many persons. After fully considering the inhalation of pollen as the source of this disease which he described as being the case in 1859, but found subsequently that Dr. Elliotson had in 1831 intimated the fact, our author remarks the way in which pollen is distributed on the mucous membrance when inhaled may partly account for the effect which so small a quantity produces. He adds:—here it is important to notice two facts to which Mr. Darwin kindly drew my attention in 1873. 1st. Pollens have been divided into two classes, namely, into *coherent* and *non-coherent*. The pollen masses of the orchids may be taken as a type of the first class, whilst the pollen of the grasses may be taken as a type of the second class. 2nd. Delpino has also divided plants into two classes according to the mode in which they are fertilised. In the one case they are fertilised by the agency of the wind and are termed "*anemophilous*" plants. In the other they are fertilised through the agency of insects, and are termed "*entomophilous.*" The grasses are examples of the first class and the orchids of the second.

Coherent pollen is seldom or never found floating in the atmosphere, and cannot therefore be a cause of hay-fever. The grains of incoherent pollen are always found floating in the atmosphere singly. In no case (says Dr. Blackley) have I ever found a number massed together or one pollen grain over-riding another on the exposed slides. It must, therefore, be that the pollen grains will be distributed in the same manner on the mucous membranes. Each one will have its own separate sphere of action in which it can expend its full power without let or hindrance, and without waste of power. We cannot with any means we have at present at command show the exact nature of the action which pollen has upon the mucous membranes; nor do we know whether the œdema which it sets up in the submucous and subcutaneous cellular tissues is due to its action upon the capillary bloodvessels or upon those of the lymphatics. But upon whichever set of vessels its power is exercised we know that the granular matter of each individual pollen grain will have its own sphere of physiological action, and that the quantity of the *materies morbi* which operates within this sphere must be exceedingly small.

The interest shown in some of the questions (the Doctor states) brought under notice has led me to give not only my new observations, but also to sketch briefly the course I have pursued in former experiments, and thus to some extent to go over old ground. This will, however, have made my object more clear to you, and will have grouped together most of the facts on which my latest conclusions are based. With one solitary exception in the matter of the genesis of hay-fever I have tried to avoid forming hypotheses. I have simply endeavoured to interrogate nature, and as faithfully as I could to record her answers. I might now legitimately draw what seem to me important conclusions from the facts I have given, but this I will not attempt to do because I feel sure that each individual mind will be able to do this for itself in a more forcible and suitable manner than I can hope to do, and I shall therefore leave each one to draw such lessons as the facts seem best calculated to teach. With regard to Ozone, Dr. Brackley, after very exact researches, states that that substance does not seem to bring on catarrh or hay-fever, being, in most cases, present in the atmosphere in very small quantities.

LONDON WATER.

"The Composition and Character of the Water Supplied to London during 1876; being a Report Submitted to the Society of Medical Officers of Health." By CHARLES MEYMOTT TIDY, M.B., F.C.S., Professor of Chemistry and Medical Jurisprudence at the London Hospital; Medical Officer of Health and Public Analyst for Islington; late Deputy Medical Officer of Health and Public Analyst for the City of London, &c., &c. London: Wertheimer, Lea and Co., Circus-place, London-wall. 1877.

MR. TIDY, in this report, gives analyses of the water supplied by the various water companies of London, and he arrives at conclusions which are on the whole very favourable. Occasional turbidity he has found in the water, and this seems to have shewn itself in samples collected in some of the months of the year, and not in others. As to this occasional turbidity, he remarks: I would note that the presence of matters in suspension is determined by examining a body of the water in a glass tube two feet in length. The suspended matter is in the main finely divided clay, and occasionally a few filaments of fungoid or confervoid growths are also present. It has always been in far too small a quantity to estimate, and its removal may be effected by subsidence and filtration. Its effect on the appearance of the water is that of a slight dimness, never amounting to opacity.

Of the total solid matter, I would remark, that about 8 grains is lime, and 0·5 grain magnesia in the water derived from the Thames, Lea, and New River; and about 10 grains is lime and 0·75 grain magnesia in the water pumped from the deep chalk wells supplied by the Kent Company. The existence of lime and magnesian salts in water used for drinking purposes, regarding it from a sanitary and dietetic standpoint, is, I consider, not merely not unwholesome, but of great advantage and importance. The truth of this observation is fully confirmed by the returns of the Registrar-General.

The quantity of ammonia present has been uniformly small; it has never exceeded 0·002 of a grain per gallon, and very often (more especially in the waters of the Kent, New River, and Grand Junction Companies) has been entirely absent.

Mr. Tidy thus concludes his report:—It will be seen that the proportion supplied for each individual has been on an average 32 gallons per day. The minimum supply was in March, 110,441,128 gallons, and the maximum in July, 137,135,102 gallons. One fact is patent—that the waste of water at the present time is very great, insomuch that the quantity delivered on the intermittent system still in use in London, is largely in excess of the quantity delivered in large provincial cities in which the system of constant service obtains. About one-half the supply was derived from the Thames, one-third from the Lea and New River, and the rest from deep chalk wells.

Lastly, I am of opinion that my analyses prove that London enjoys a water supply of very considerable purity; and I am further convinced that, from a medical point of view, no substantial objection can be urged against its wholesomeness for dietetic and culinary purposes.

MURBY'S ADVANCED EXCELSIOR READERS.

"The Advanced Excelsior Series." Books 4 and 5. London: Thomas Murby.

THESE Educational works are worthy of al praise. Looking at them from the point of view we are disposed to look at them, they seem to be just the thing to give to youthful minds that bias in favour of science as contradistinguished from literary knowledge, which we are disposed to consider the great educational desideratum of the day; not that the reading lessons in these books are all scientific, for, in point of fact, there are selections from good authors in prose and poetry as well as science to be found in them. Physical Geography, Physiology, Botany, and Mechanics, are amongst the subjects included in these readings; and we consider the editor is quite justified in stating that these will be found not only sufficient to prepare candidates for examination in those subjects, but also to lay an excellent foundation for the study of the Natural Sciences, a branch of education which is daily increasing in importance.

Besides these additions, the present volume includes an increased number of miscellaneous extracts in prose and verse, carefully selected for the present standard. They are adapted to stimulate the attention and improve the taste, as well as to increase the knowledge and cultivate the understanding of the pupil.

With each lesson are given Questions which will be of use to young teachers in examining their classes; or in teaching practical composition, the answers being required to be given in writing.

To the illustrations, which in number and execution will be found to bear comparison with those contained in much more expensive works, special attention has been paid, so as to render them at once illustrative of the text, and attractive, as well as instructive, to the reader.

The exercises in Grammar and Composition, which are appended to the reading lessons, will be found useful not only as a help to junior teachers in class, but also as subjects for home lessons.

At the head of each lesson an explanation is given of the more difficult terms occurring therein, while at the foot there is appended a copious list of words for spelling, the accentuation of which is invariably marked in accordance with the best authorities. The meaning and derivation of all the words in the spelling lessons—that is, of all the hardest words in the book—are given collectively in the vocabulary, which has been added to the volume, partly with the design of accustoming the young reader to the invaluable habit of consulting a dictionary.

BEVAN ON THE INDUSTRIAL CLASSES AND STATISTICS.

"The Industrial Classes and Industrial Statistics." By G. PHILLIPS BEVAN, F.G.S. Textiles and Clothing, Food, Sundry Industries. With maps. London: Edward Stanford, 55, Charing Cross, S.W. 1877.

THIS work is one of very interesting character, as it supplies full information as to the condition, whether social or industrial, of the working people of this country. Mr. Bevan's views in writing this treatise being that a pendant dealing with that large section of our population employed in British manufacturing industries might be added by having one volume in the series of volumes bearing the title of the "British Manufacturing Industries," devoted to that subject. Hitherto we have, says Mr. Bevan, been engaged with the nature of the *work* done; it is now proposed to take up the subject of the *worker*. It is singular, even in these days of social science, to note how scanty and scattered is all information about the British workman. There are no books in detail that are devoted to him, his concerns and interests being principally to be gathered from blue books, reports, transactions of societies, and the public newspapers. From a political point of view, he has been frequently written and talked about – too much so indeed for his own good or for the good of the country,—but comparatively seldom, when we come to inquire into his social condition, as dependent upon, or connected with, his special branch of labour.

Together with the many changes in the methods of manufacture, there have been equal revolutions in the style and character of our artisans. Many new trades and processes have been introduced which were unknown thirty years ago, while, on the other hand, manufactures which were then of the highest importance, have dwindled down, and are now in a way to become extinct. Few people are aware of the immense development of the last quarter of a century in the condition for the better of our English operatives, whether in a monetary, social, educational, sanitary, or legislative light; it is very doubtful whether the bulk of the working classes themselves ever take heed of the strides that they have made, or think how little they have to lament that the "good old times" are past and gone.

Mr. Bevan states in the introduction to this valuable work: I have endeavoured to discuss the branches of our manufacturing industries, though, from my limited space, very briefly. It has been my aim to show how steadily progressive has been the legislation for the protection of life and health, and how our factory and other working-class Acts have grown up, as the result of much experience and constant watchfulness on the part of successive governments. I have carefully avoided the political side of the question throughout, feeling the uselessness of discussing points, about which such grave differences exist. I may, however, be permitted to express an opinion, that it would be better for the English artisan himself, if he attended more to his own self-improvement, than to the constant agitation which is too often based upon, and the result of, insufficient and one-sided information. The educational phase too has been omitted, both from want of space, and because it has been made the subject of innumerable documents and reports elsewhere.

As regards the statistics of population and employés, in the main, the Census tables and the Factory Returns of 1871 and 1874 have been followed, as being the latest official statements on these matters which have appeared. These have frequently, however, been supplemented by later returns from various sources, or from private inquiries. The question of wages is always a difficult one, about which to gain accurate information. The Factory returns contain a large amount of matter on this head, of which use has been freely made, and, where possible, statements of wages at the present time have been placed side by side. In most cases the fullest information has been afforded to me, while, in a few, my request has been declined or unanswered. Anyhow, the general reader, for whom these volumes are intended, will have sufficient data to show him the ordinary earnings of our British working classes, and can therefore draw his own conclusion as to their domestic social condition.

In dealing with the statistics of each trade, more figures have possibly been introduced than may be agreeable to my readers, but I have done so in the hope of showing, how intimately allied is the development of our manufactures with the state of wages and the general condition of the working classes, and of making this branch of my subject rather a text upon which to found my discourse, than as the main feature of the work.

In conclusion, Mr. Bevan says he acknowledges the very courteous and kindly assistance which has been afforded to him by a great number of correspondents, official and otherwise, the majority of whom, although immersed in business themselves, have yet found time to procure him the knowledge which he sought. He adds:—I have freely borrowed, wherever any information was to be gained, although in all cases the source from which it was obtained has been acknowledged. Where so many facts and figures are involved, there must needs be errors or omissions; and for any corrections or additions I shall be greatly obliged.

The work is divided into chapters which severally relate to textiles and clothing, cotton, flax, linen, and jute, woollens and worsted, silk, lace and hosiery, minor textiles, bleaching, dyeing, and printing, clothing and dress, leather, ropes, and india-rubber, food industries, sundry industries, working-class federation, working-class legislation, and index, which gives a list of the different Acts of Parliament affecting the working classes.

CLISSOLD ON THE DIVINE ORDER OF THE UNIVERSE.

"The Divine Order of the Universe, as Interpreted by Emanuel Swedenborg, with Especial Relation to Modern Astronomy." By the Rev. AUGUSTUS CLISSOLD, M.A. London: Longmans, Green, and Co.

THE author gives the following account of this work in his preface:—The science of astronomy in its relation to religion has been the source of two different influences upon the human mind. In the one case, it has led the Christian to a more devout adoration of the Creator, arising from the contemplation of the vastness of Creation; in the other case, it has disturbed his belief in regard to the truths of Christianity. It was in order to remove doubts and difficulties upon this subject, that Dr. Chalmers preached and published a series of astronomical discourses entitled "Christian Revelation viewed in connection with Modern Astronomy," in which he maintains a plurality of worlds inhabited by rational beings, and adoring the same God as Christians upon our earth.

These discourses found a scientific and decided opponent in Dr. Whewell, late master of Trinity College, Cambridge, who published an essay on the plurality of worlds, the object of which was to shew, that our earth alone is habitable and inhabited, and consequently that Christianity is a purely local economy.

This essay of Dr. Whewell found in its turn a scientific and resolute opponent in Sir David Brewster, who published a work entitled, "More Worlds than One, the Creed of the Philosopher and the Hope of the Christian." In this work, the author speaks of Dr. Whewell's essay as tending "to ridicule and bring into contempt the grand discoveries in sidereal astronomy by which the last century has been distinguished." Accordingly, he defends the position taken up by Dr. Chalmers, and pleads the testimony not only of the greatest astronomers, but also that of Emanuel Swedenborg in a remarkable passage taken from his treatise "*De Telluribus in Universo.*"

This work of Sir David Brewster finds, in its turn, in the present day, an opponent in an honorary secretary of the Royal Astronomical Society, namely, Mr. Proctor—a popular and talented astronomer, who holds the Brewsterian theory to be untenable; and in an article in the *Belgravia* Magazine for September, 1876, entitled, "Swedenborg's Visions of other Worlds," reviews the treatise of Swedenborg in such a way that what Sir David Brewster said of Dr. Whewell's essay may also be said of Mr. Proctor's article, namely, that "its tendency is to ridicule and bring into contempt" the writings of the author whom he criticises. Accordingly a leading Church of England periodical observes—"Mr. Proctor writes moderately but conclusively on Swedenborg's "Visions of other Worlds," pointing out the absurdities of a great dreamer, to whose ravings some people nowadays attach too much importance."

A remark of this kind, assuming it to be just, would commit the readers of every religious periodical to a course of argument which would compel the Christian Evidence

Society to create freethinkers faster than it confuted them. As, however, other periodicals have commended Mr. Proctor's article to the attention of the readers of Swedenborg, the author of the present tract has thought it his duty to accept the invitation, and in so doing he too hopes to write "moderately and conclusively."

One principal objection urged by Mr. Proctor seems to have been taken from a modern work entitled, "The Unseen Universe," which has attained to considerable repute, having arrived at a sixth edition. The objection urged in both cases being the same, the answer given in this respect to both is also the same; Mr. Proctor justly admitting with regard to Swedenborg, that "no more honest man ever lived," and the authors of "The Unseen Universe" that "he was a profound thinker."

The obvious cause of the discordances of astronomical writings in relation to the subject of revealed religion, is the lack of some great principle of unity calculated to harmonize the two, and co-extensive with the Divine order of the universe. This principle, as explained by Swedenborg, it is the object of the present work to point out; and to apply to the religious difficulties to which astronomy has given rise. In so doing we are brought face to face with the analogies said to be derived from science; and with the fallacies of Naturalism, whose office is in the present day what it has always been since the fall of man, namely, to misinterpret and ridicule whatever it cannot degrade to its own level of thought.

In treating of the Divine order of the universe, it has been necessary to treat not of the Natural world only, but of the Spiritual; for, in its most comprehensive sense, both are included in the term universe. Hence the present work does not treat of the Divine order of part of the universe, but of the whole, or otherwise the title would be misleading. Indeed the time has now come (says our author) in which this must be done, or the whole subject be adandoned to the freethinker, as being too vast a theme for Christianity to deal with.

It is not a little remarkable that the essay on "The Plurality of Worlds," by Dr. Whewell proceeded from the same college of which the Rev. John Clowes was a Fellow; and in his time not only a Senior Wrangler, but the first in this country to translate and circulate the very work, "*De Telluribus*, which the honorary secretary of the Royal Astronomical Society has now more than called into question. Dr. Whewell, when writing his essay, could scarcely have been ignorant of this circumstance; and even if he was, the extract from that work, as given by Sir David Brewster in answer to the essay, was amply sufficient to remind him of it.

It was impossible to treat fairly of this subject, without giving some general idea of the literature with which it is more immediately connected, and of the arguments which it involves. It is only thus that the real place of Swedenborg's teaching upon this subject can be impartially presented to view, and rightly understood. This is of the more importance, when there are doctrines of Evolution abroad of which it has been said:—

"The idea of a personal Creator of the universe is proved, as an inevitable corollary of these doctrines, not only to be untenable and impossible, but to be so supremely irrational, that it can only have arisen in what represented the minds of men, during those inconceivably dark ages when they were slowly evolving themselves from their ancestral apes into something resembling humanity."

Doubtless to such persons the truths of Christianity are "the absurdities of great dreamers;" to all of whom nevertheless we may reply in the language of the Apostle —"*Non insanio, optime Feste, sed veritatis et sobrietatis verba loquor.*"

After having perused this cleverly written work, we cannot say that what Mr. Clissold puts forward would clear up the matter, for he requires one to grant all his assumptions, and then claims to have proved his case.

BOURNE ON IMPORTS AND EXPORTS,

The Growing Preponderance of Imports over Exports in the Foreign and Colonial Trade of the United Kingdom. By STEPHEN BOURNE, F.S.S.

Since 1872 a marked alteration has taken place in the relative values of the imports and exports of the United Kingdom. Up to that date, and indeed until the middle of 1873, the general progress of our trade showed a steady increase in both branches, and if here and there special circumstances caused one year to fall short of its predecessor,—the deficit was speedily more than restored—we had come to look upon continual growth as the normal condition of our commerce, and though for about half a century the balance had been in favour of imports, this excess arose from their continuous increase, not from the decrease of the exports. For 1872 the difference between the two—the balance of trade as it is usually termed—was 40 millions, for the present year it is fully three times as much, 120 millions. So decided and rapid a change demands more than a superficial inquiry into its causes and effects. The object in this pamphlet is by the figures produced to at least aid investigations as deep and searching as the importance of the subject requires, and Mr. Bourne has done his work most admirably, and deserves every attention.

"KNIGHTS' PRACTICAL DICTIONARY OF MECHANICS." Published by Messrs. Cassell, Petter, and Galpin, appears, as far as we can judge from one number, which is the only portion of it we have received, promises to supply an acknowledged want,—a book of ready reference on mechanical subjects posted up to date.

THE "DICTIONARY OF COOKING," by Messrs. Cassel's, still continues its satisfactory course of progress.

Correspondence.

To the Editor of the SCIENTIFIC AND LITERARY REVIEW.

SIR,—Permit me to mention a fact which has occasioned me to ponder over various scientific theories, without however arriving at a proper conclusion.

It occurred in the following way.—I returned to England a few years ago, after a sojourn in one of the affiliated kingdoms, where I noticed year by year the extraordinary absence of thunder storms—summer and winter the same state. Now I remember when a lad in one of the northern counties, there were at least three storms during the summer, for one now. That time is scarcely the good old one of "50 years ago," which makes the change more remarkable. I do not think I am propounding phenomena on the basis which, as to meteoric light, made Mr. Pickwick believe himself to be an eminent discoverer, and I hope some of your scientific readers may find time to give us the *rationale* of this.

Suppose that thunder discharges are the result of particular relations of the clouds, brought about by the wind and otherwise, what may, I ask, have been those relations within recent years, and may we anticipate further decrease?

I am your obedient servant,
J. J. GORDON, D.C.L.

PATENT LAW CONFERENCE AT THE SOCIETY OF ARTS.

ON the 6th and 9th of March a Patent Law Conference was held at the Society of Arts, with the view to consider the New Patent Bill now before Parliament (a synopsis of which we gave in our last issue). This Conference was commenced by an able explanatory paper being read by Mr. Trueman Wood, the assistant Secretary of the Society of Arts, and was attended, on behalf of the Inventors' Institute, by Sir ANTONIO BRADY, the President, and Mr. CAMPIN, the Secretary; Admiral SELWYN, V.P., Inventors' Inst.; Mr. F. H. VARLEY, C.E.C., Inventors' Inst.; Mr. T. PATERSON, Member of the Executive Council, Inventors' Inst., and other members. There were also present Messrs. MOTTERSHEAD and G. SAVAGE as representing the Artizans' and Inventors' Patent Law Amendment Committee. Also Messrs. A. J. Mundella, M.P., F. H. Bramwell, C.E., Theo. Aston, Q.C., E. Cowper, C.E., —. Olrick, C.E., Lloyd Wise, C.E., Smartt, Pieper, Dr. Lempriere, W. Smith, C.E., and many other gentlemen interested in the Patent Question. Major Beaumont, M.P., was the Chairman on both days of meeting.

After much discussion, in which the above named took part, the following resolutions were passed, most of them by unanimous vote:—

1. That this meeting is gratified to perceive that the necessity for additional Commissioners of Patents is recognised, but at the same time it desires most strongly to express the opinion that such Commissioners should be paid, the meeting being of opinion that unsalaried officials cannot be expected properly to perform the important duties required of them.

2. That no adverse report of an examiner, even with a right of appeal, ought to preclude an applicant from obtaining a patent, at his own cost and risk. And further, that reports containing opinions of Patent-office authorities ought not to be made public, but that opportunity should be given to the applicant of amending his specification, by inserting reference to matters discovered by the authorities, with a definite statement of what he nevertheless claims.

3. That compulsory licenses are not desirable.

4. That sub-section 1 of clause 22 of the Bill, relating to compulsory working, ought to be omitted.

5. That the provisions of the Bill, so far as they relate to the amendment of specification by way of disclaimer, explanation, supplement, or otherwise, and to the prolongation of the term of a patent to 21 years, should be extended to existing patents.

6. That the requirements of the Patent-office be properly provided for, and a suitable museum and public library maintained, before the funds derivable from the stamp fees are used for the general purpose of the State.

7. That with a view to avoid all obstruction to the production of inventions for public use by prohibitory taxation, the stamp duties on patents in all stages should be materially reduced, particularly in the initial proceedings, and that it is not desirable that the fees or stamp duties, levied on inventors in respect of patents for inventions in the United Kingdom, should materially differ from those in other States likely to be competitors in manufactures.

8. That all reductions of stamp duties should be made applicable to all existing patents.

9. That the three last lines of section 23 of the Bill should be omitted, viz.:—"The provisions of this section relating to a foreign patent shall extend and apply to a colonial patent (that is, a patent granted in any part of Her Majesty's dominions out of the United Kingdom)."

10. That sub-section 4 of section 23 of the Bill should be omitted, viz.:—"The patent shall cease on the cessor of the foreign patent or of such one of the foreign patents (if more than one) as first ceases."

11. That a deputation be appointed to wait on the Attorney-General with a copy of the resolutions, and in case he shall not accede to the same, then that the Chairman, or some other member of Parliament, be requested to propose in committee amendments, in conformity with the resolutions.

The proceedings concluded with a vote of thanks to the Chairman.

INVENTORS' INSTITUTE PETITION TO PARLIAMENT ON THE PATENT BILL.

AFTER the usual superscription to the Lords and Commons respectively, this petition states as follows:—

The Humble Petition of the President and Executive Council of the Inventors' Institute,

HUMBLY SHEWETH,—

That your petitioners, the President and Executive Council of the Inventors' Institute, while recognising with gratitude the advantages conferred by the Bill now before Parliament in the extension of duration of patents to 21 years, and the longer existence of provisional protection, are yet desirous of pointing out other necessary changes *not* provided for in the said Bill. At the same time, your petitioners desire to draw attention to the fact that all benefits conferred on inventors are in a much larger sense benefits conferred on manufactures and manufacturers — and through them are mainly conducive to the wealth and prosperity of the realm. That for this reason patents were first granted, and for this reason they ought to be upheld and perfected.

Your petitioners are of opinion that the addition of one hundred pounds to the total fees (although for a 21 years' patent), while opposed to the policy of other nations in this matter, is neither likely to increase the revenue, nor to fulfil the ostensible object of weeding out useless patents. Even the fees proposed to be charged in the first instance would overweight the industry of the country, and thereby put our working men inventors at a disadvantage when compared with those of other countries.

Your petitioners therefore pray that your Honourable House will consent to a material reduction of the fees on patents,—and a change in the mode of payment, so that the requirements of the Patent Law of the United Kingdom may compare favourably in these respects with those of other nations.

Your petitioners also pray that their brother inventors in the colonies of Great Britain may be admitted to full and equal participation (so far as can be done in accordance with colonial laws) in all the benefits to be derived from an amended state of the law on patents in the United Kingdom.

Your petitioners consider that any preliminary examination should simply be of an advisory character, and should not extend to any other subject than the novelty as shown by the records of the Patent Office; and that this should be upon a search limited to 21 years last past.

Your petitioners object strongly to references being made to the Lord Chancellor or to the Law Officers already overburdened with work, on subjects which could be decided more fitly by competent paid Commissioners of Patents, who should have no other work to do.

Your petitioners also consider that a system of compulsory licenses would fail to be satisfactory, as interfering with the laws of supply and demand. That equally objectionable is the revocation, on so-called "reasonable grounds," since no man can define these, and it is an unjust interference with the property in a patent, which would tend to render it worthless.

Your petitioners would finally and respectfully suggest that it is not desirable that the fees or stamp duties levied on inventors in respect of patents for inventions in the United Kingdom should materially differ from those in any other State likely to be a competitor in manufactures, and that the benefits to be derived from any change in the present law on patents should be extended to existing patents, in order to obviate the complications arising from two classes of patents being in existence at the same time.

Your petitioners therefore humbly pray that your Honourable House will take the above into your favourable consideration, and that the said Bill may be so amended as to be in accordance herewith.

And your petitioners will ever pray, &c.

PROPOSED PETITION TO PARLIAMENT BY THE ARTIZANS AND INVENTORS' PATENT LAW AMENDMENT COMMITTEE.

The Humble Petition of the Artizans and Inventors' Patent Law Amendment Committee, through its President and Secretary,

SHEWETH,

That your petitioners, being for the most part artizans and poor inventors, view with great satisfaction the earnest desire of your Honourable House to deal with and settle the present anomalous state of the Patent Law, both as to its uncertainty in securing the right to a Patentee, and position relatively to the law as practised in other nations; and your petitioners approving the principle of the Attorney General's Bill now before your Honourable House, which appoints examiners to adjudicate in the process of obtaining a patent for an invention, would humbly suggest that the number of such examiners proposed by the bill is inadequate, and that they will be inefficient from that cause to perform the duties which will naturally fall to them, and there is some apprehension that through the probable overstrain caused by the introduction of this much needed process, the examination into the nature of an invention as proposed by the bill may become perfunctory, and thus fail to secure that certainty of right and protection for an invention which ought to constitute the basis of property in a patent.

Your petitioners would therefore respectfully recommend the appointment of an enlarged body of competent paid scientific and legal examiners, a main part of whose duties should be to minimise litigation by preventing inventions from repetition of patent by other professed inventors.

Your petitioners also consider that in disputed patent cases, the present cost of proof to the aggrieved is often much too onerous on poor inventors, and thus leaves them at the mercy of richer rivals. Your petitioners would therefore further suggest that law proceedings on infringements of patents or other breaches of the rights of a patentee, or breach of duty on the inventors' part, should no longer be restricted to the higher courts of law, but that power of adjudication should be fully given to the County Courts.

Your petitioners further view with deep concern, that although the Bill before your Honourable House materially reduces the stamp duties for a patent right, they are still kept at a rate incompatible with the resources of many inventors. These stamp duties still impose heavy costs, thereby crippling efforts at improvement in machinery and manufactures, in a country too where machines and manufactures are the essential condition of its existence. Whereby the public welfare is thus manifestly injured.

Your petitioners therefore humbly pray your Honourable House to amend the Bill in Committee, so as when passed into law it shall simplify and make easy the process for procuring a patent. That it shall also grant as far as may be reasonable an indefeasible right and security in a patent when once granted, and in all stages of its life very materially reduce the stamp duties upon a patented invention.

And your petitioners, as in duty bound will ever pray, &c.

SONNET.

Ianthe, is thy soul less warm to song,
Flows not the chalice of thy heart with wine
As rich, and pure as when it mingled mine?
Rest not the dew-drops on the blossom long,
Are harps Æolian mute to move thy tongue?
The flow'rs thou gav'st in love are still my shrine,
And ask in fading but for breath of thine:
As sunlight wakes day's dawning into song!
The latent lustre of thy bright blue eyes
Lends but a shadow where thou'rt wont to be;
Must thy sweet spirit live in gentle guise,
Veiled 'mid a world of worshippers, and we
Left but thine image to immortalize,
And morn and even pass and bring not thee?

HENRY GEORGE HELLON.

CHEMICAL MEMORANDA.

CHRYSOÏDIN, a yellowish-red colouring matter, which has been used in dyeing for some time past, has been investigated by Prof. A. W. Hofmann, who pronounces it to be a diamidized azobenzol, $C_{12} H_8 (NH_2)_2 N_2$. The compound occupies, therefore, an intermediate place between monoamido-azobenzol and triamido-azobenzol, two well-known substances. Its tint, too, lies between the yellow of the mono-body and the brown of the triamido-compound.

According to a statement of B. Zöller, the potassium salt of xanthogenic acid is an antiseptic unsurpassed in excellency by any of the known preservative agents against putrefaction. A sample of grape-juice, to which a minute quantity of the salt had been added, possessed after three months the full sweetness of the fresh juice. Potassic xanthogenate may possibly find application for theraputic purposes.

By allowing metallic sodium to remain for several months in contact with oil of turpentine, frequently shaking up the latter with atmospheric air, Papasogli obtained the sodium salt of a new acid. By replacing the sodium by lead, and treating the lead salt with sulphuretted hydrogen, the acid was obtained in free state. It crystals melt at 97° C., and are soluble in boiling water, alchohol, and ether.

An interesting method for preserving urea is described by E. Schmidt in *Berichte* of the German Chemical Society. He passes carbon sulfoxide, COS, into a concentrated aqueous solution of ammonia, and evaporates the liquor in large watch-glasses until all ammonia carbonate and ammonium sulphide have volatilized, when the characteristic crystals of urea will be found left on the glass.

Dr. Bastian's experiments, stated to have resulted in the spontaneous generation of bacteria in urin which had been carefully neutralized with caustic potash, have been repeated by Pasteur and Jeubert; the investigators obtained results entirely contradicting Dr. Bastian's assertions.—*Athenæum.*

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THE INVENTOR'S INSTITUTE,

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Past Presidents:

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P.

President, SIR ANTONIO BRADY.

SESSION 1876-77.

MEMBERS' MEETINGS AT 8.15 P.M.

THURSDAY, 5th April.—Patent Law Meeting.

THURSDAY, 26th April.—Dr. J. D. Macdonald, F.R.S., Deputy-Inspector General of Hospitals and Fleets, "Improvements in Ventilation," and the "Freeing of Chimneys from Smoke."

Executive Council Meetings same days at half-past 7 p.m.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts. F. W. CAMPIN, Sec.

N.B.—The movement for the REDUCTION OF PATENT STAMP DUTIES *is still on foot; those who wish to support it should at once communicate with the Secretary.*

Proceedings of the Institute.

ON the 8th March the Executive Council met, Admiral SELWYN, V.P., being in the chair.

After the passing of the minutes of the last meeting, and some general business, the meeting merged into the Patent Law Conference, when the New Patent Bill was considered clause by clause, and suggestions for modifications and amendments were made by Mr. F. H. Varley, C.E., Messrs. Allardyce, Mottershead, and others, same being in general accordance with the Inventors' Institute's Petition to Parliament (given in another column) and the suggestions accompanying the synopsis of the Bill by Mr. F. W. Campin, which we published in last month's issue.

A resolution was passed requesting Admiral Selwyn to draft his suggestions and amendments in detail, and place them before the Special Committee of the Institute appointed by the Resolution of Executive Council at its Meeting on 22nd February, 1876, as reported in our last issue. The Special Committee to be empowered to take any action thereon they may find necessary.

On 22nd March at the Executive Council, the Secretary reported that the Draft Petition to Parliament on the New Patent Bill, after having been submitted to and approved by Mr. Mundella, M.P., as directed by Executive Council, had been engrossed and signed by the President and Secretary, and transmitted to Mr. Mundella for presentation, with a request that it be read at the table of the House, so as to get it fairly before all its Members. Several inventions of a minor, but useful character, which will be duly noticed in our columns, were introduced to the Exposition Meeting the same evening.

Monthly Notices.

The Royal Academy of Sciences, of Denmark, offers a gold medal for researches into the numbers which have served as a basis for astronomical science from the time of Ptolemy to the end of the eighteenth century; and another for an investigation of the refraction of light, especially with regard to the refractive and dispersive power of certain volatile bodies in the state of vapour. The competition is open to all the world, and the essays must be sent to the University of Copenhagen before the end of October.

Sir C. Wyville Thomson has been appointed Rede Lecturer at Cambridge for the ensuing year.

Mr. Meakin's Inventions.—We have received communications on the subject of Mr. Meakin's controversy with Sir Edmund Becket (formerly Becket Denison). From what we know of both parties, and the evidence that has been laid before us, we are inclined to consider Mr. Meakin in the right, and Sir Edward in the wrong; but we shall probably present our readers with the details of this matter.

Death of Admiral Sir Edward Belcher.—Not only was he distinguished as one of the Arctic Voyagers, but he was equally eminent as a man of Science. Sir Edward was one of those who took part in the formation of the Inventors' Institute.

Under the title "Archivos do Museu Nacional do Rio de Janeiro," the naturalists and *savants* of Brazil have commenced a scientific publication which, we may hope, has before it a long career of usefulness. With new regulations for their institution, and a means of making their researches known, they intend to investigate, to use their own words, "the three kingdoms of nature so richly represented in the empire of Brazil." The three parts of the *Archivos*, now published in royal 4to., with well-executed plates, are a praiseworthy beginning, for they offer to the naturalists of other countries a description of an extraordinary creature, *Batrachychthys*, or frog-fish; an account of the sambaquis, or kitchen-middens, which are numerous on the coast of southern Brazil, and contain specimens of handicraft, stone implements, and other relics of remote antiquity; contributions towards an anthropological study of the indigenous races of Brazil, illustrated by series of skulls; the physiological action of the urari poison, and other archæological and natural subjects. In sending this instalment of their work the promoters of the museum appeal to the scientific societies of Europe for an exchange of publications.

The Telephone is stated by American papers to have been used to make a verbal report of Professor Bell's lecture to the *Globe* office in Boston, U.S., eighteen miles away. Not only was the voice of the reporter clearly recognised, but the receivers of the message also heard the applause of the audience which attended the lecture. From his platform, the speaker placed himself in communication with Mr. T. A. Watson, his associate in Boston. The latter then sent the Morse alphabet by musical sounds, which was distinctly audible to the entire audience. The airs played on an organ were transmitted; and on being asked for a song, Mr. Watson complied with "Auld Lang Syne," and finally made a short speech, the words being perfectly distinguishable to all the people present, who broke into prolonged applause, for which Mr. Watson returned thanks. Every experiment was successful, and the invention was subjected to severe tests.

A Wonderful Species of the Cotton Plant is stated by the *Scientific American* to have, according to a cable despatch from London to one of the U.S. daily papers, been discovered in Egypt by Signor Giacomo Rossi, Austrian Consular Agent at Alexandria. He has found a new cotton plant, which is so wonderfully prolific that it may prove a dangerous enemy, the report says, to the American cotton raising interests. Signor Rossi, in his report of the discovery, says that about two years ago he accidentally came across the new plant on the property of a captain in the Menulia District, who collected the seed and sold it to his neighbours at twelvefold the price obtained for the ordinary kind. The plant has a long stem, and being without branches much space is saved. It bears on an average fifty pods on each bush, while the usual yield of the plant is about thirty. A smaller quantity of seed is needed, but the great drawback in Egypt is that it requires much more water, which necessitates the alternating of the crops with grain and vegetables. In the sea islands of the Atlantic coast, or along the lower Mississippi, it would probably prove wonderfully prolific.

THE SCIENTIFIC REVIEW
AND
Scientific and Literary Review.
A RECORD OF PROGRESS IN
ARTS, INDUSTRY, AND MANUFACTURES,
INCORPORATING THE
JOURNAL OF THE INVENTORS' INSTITUTE.

APRIL 1, 1877.

GENTEEL ENGINEERS.

The position of engineers in the Royal Navy has at last been deemed worthy of the consideration of Parliament, to whose notice the subject has been brought by a most able exponent, Mr. E. J. Reed, M.P.

This matter had, however, already engaged the attention of the Government, the Admiralty having in September, 1875, appointed a committee, under the presidency of Vice-Admiral Sir A. Cooper Key, to consider "How the most scientific and practical management of engines, and the highest mechanical skill for their maintenance, can be secured for Her Majesty's Navy," and this committee has reported as its opinion (which will doubtless influence the settlement of the question) in terms we consider thoroughly reprehensible.

It appears that our naval engineers, who are Government bred, entering, as they do, the Royal Dockyards, as lads between the ages of 14 and 15, selected by competitive examination, and being trained up scientifically and practically (then upon passing through the Royal Naval College at Greenwich) commence as second-class assistant engineers at 6s. a day, and thence proceeding by successive steps, at about 40 years of age may reach the rank of chief engineer, with a maximum pay of 10s. per diem, and afterwards they may proceed to the higher grades of the service.

It seems, however, that this system, (which one would be disposed to consider as far inferior to drawing young men by competitive selection from the ranks of our marine engineers), is found objectionable, as regards tardiness of promotion and the treatment engineers receive when afloat. For instance, whilst other officers have cabins, they have only hammocks, and are excluded from mess, and other social advantages such officers possess, and that owing to these drawbacks, notwithstanding the high education given, and the position in which the engineer officers are placed on board ship as commissioned officers, a large proportion of candidates for entry as engineer students are sons of artisans of various grades in the dockyards, of seamen and marines, or of others belonging to the same class of society. At once the committee give up any hope of amalgamation as hopeless, and express the conviction that it is impossible to expect the bulk of students at present entered can possibly hope to take their places properly with officers of a corresponding rank in the wardroom or gunroom messes. The remedies they propose are, first, that, in the admission of candidates to compete, more searching inquiries be made of the referees named by the parents (in accordance with the existing regulations), to insure that the candidates are in all respects eligible for their future position in Her Majesty's service; second, that the students should pay a certain sum to defray in part the expenses of their education, as is the case in other branches of the service, and the custom in every other inlet to the profession of engineer. They express the opinion, then, that the present indiscriminate admission of all classes of lads to enter as students has, undeniably, a marked effect in deterring professional men, and the middle class generally, from entering their sons as engineers. They also suggest that if this precaution is adopted and the regulations relating to the engineering branch of the Navy were freely circulated throughout the country, candidates would be obtained from the inland districts instead of from the naval ports only, as is at present the case.

Thus, according to this committee, the necessity for keeping up the gentility of the officers of the Navy is the one great point, our naval officers having become such *fine gentlemen* that a man, necessarily obliged to have close acquaintanceship with grease and soot, and, forsooth, the son of an artisan, cannot be tolerated at mess tables. This is something which ought to open the eyes of the public to the real reason why *Vanguards* are lost and *Thunderers* get into trouble. Our Navy, if this be true, is now officered principally by men whose great care is for gentility, not for the prosperity of the Navy; and who may be expected to communicate some similar feeling even to the engineers,—hence professional capability is not so well developed as it should be, and danger and disaster ensue.

But really the idea that has possessed this committee reads very much like a gross libel on the English race, for it, in fact, asserts that no amount of education, training, and association with gentlemen will remove the natural brutishness of the plebeian classes—a manifest falsehood, as everyone who has intercourse with general society can testify, since there are men now of high social position, and accepted companions of gentlemen, sons of common labourers or shoeblacks.

But the public aspect of this matter is of exceeding gravity, for this same committee tells us that, applying their attention to the pay, and especially position of chief engineers, they approached one of the most difficult parts of their duty. A chief engineer is necessarily a man of responsibility, but in the present day, when he is placed in charge of such engines as those of the *Thunderer*, *Alexandra*, or *Inflexible*, his control is practically so great as to encroach even on the undisputed power of the commanding officer. Yet, as has been asserted over and over again, in spite of the vast responsibility thrust upon him, not only have his prospects not improved, but his position is absurdly subordinate. He is not merely subject to the captain, which he has never complained of, but to the youngest lieutenant, who hardly knows the difference between a safety valve and a piston rod, or between a compound and an ordinary marine engine. And to quote Mr. Reed, for his remarks on this subject are very much to the point:—"Not only are a couple of commanders (besides the captain) before him, but half-a-dozen lieutenants, a staff surgeon, and a paymaster all have precedence of him. In a word, of all heads of departments in the ship, he is placed the lowest, and below, as I have said, a number of young lieutenants who are, in no sense, heads of departments at all." This remark, by the bye, was made about the inspector of machinery, a rank above that of chief engineer, but it is applicable to the case of the latter. Again, he remarks that "the officer in charge of all the machinery of the *Devastation*, a chief engineer, receives for pay less than £300 a year." Was he not right in insisting, then, that "the class of naval engineers should be raised to a level corresponding to the greatness of their present trust and to the weight of their enlarged responsibilities."

In regard to the pay and other matters connected with our naval engineers the committee make very sensible and valuable suggestions, and it is a great pity its report has been marred by the bugbear of this finical gentility crochet, which it should have been their business to scout as utterly unworthy of any real gentleman, and true member of the Naval profession. For though it would not perhaps be out of place to test whether an engineer officer possesses so much of good manners as to be a fit associate of gentlemen, yet that his birth and presumed ill-manners should be an insuperable bar to professional companionship is utterly unworthy of our Naval officers, and likely to be disastrous in its effects on the prosperity and renown of the British Navy.

Proceedings of Societies.

ROYAL SOCIETY.

February 15th. — Dr. Hooker, President, in the chair. The following papers were read: "On Stratified Discharges. III. On a Rapid Contact Breaker and the Phenomena of the Flow," by Mr. W. Spottiswoode,—"On Lymphatics and their Origins in Muscular Tissues," by Mr. G. Hoggan and Mrs. Frances Elizabeth Hoggan,—and "Remarks chiefly on $487\overset{?}{\equiv}846$," by Mr. W. Shanks.

February 22nd.—Dr. Hooker, President, in the chair.—The following papers were read: "On Crookes's Force," by Messrs. G. J. Stoney and R. J. Moss,—"On the Structure of Magelona," by Dr. McIntosh,—"On a New Form of Tangential Equation," by Prof. Casey,—"Addition to the Bicircular Quartic," by Prof. Cayley,—"On the Influence of Height in the Atmosphere on the Diurnal Variation of the Earth's Magnetic Force," by Mr. J. A. Broun,—and "On Heat as a Germicide when Discontinuously also Applied," by Dr. Tyndall.

ROYAL SOCIETY OF LITERATURE.

February 21st.—Sir P. de Colquhoun in the chair.—Prof. Zerffi read a paper, in which he traced the origin of the Slavonic populations, showing their ethnological and linguistic affinities with the Aryans, and pointing out that there were, at present, no less than seventeen different dialects, the descendants of one original tongue. The Professor then stated the chief characteristics of the literatures of each of the tribes. Thus, the Serbs are rich in most interesting heroic songs; the Poles in lyrical poetry; the Slovacs in pastorals; while the Russians love rhetorical pomp and gorgeouness in prose. The Czechs, on the other hand, prefer diving into the depths of didactic poetry. The works of the most important Slavonic writers, past and present, were then referred to in much detail.

GEOGRAPHICAL SOCIETY.

February 26th.—Sir R. Alcock, President, in the chair.—The papers read were: "On his recent Journey to Lake Nyassa," by Mr. E. D. Young,—and "Examination of a Route for Wheeled Vehicles between the East Coast of Africa and Ugogo," by the Rev. R. Price. The following gentlemen were elected Fellows: Sir H. Thring, Major G. Noel Money, Commander A. A. Chase Parr, Dr. C. H. Haines, Rev. W. E. Browne, Messrs. W. Andrews, S. Davenport, G. Dobson, J. Emery, F. O. Karuth, R. A. Laing, J. Lobb.

GEOLOGICAL SOCIETY.

February 7th.—Professor P. M. Duncan, President, in the chair.—Messrs. J. Durham, H. W. Harrison, W. Hutchinson, H. M. Klaassen, G. Ogilvie, J. W. Spencer, and G. W. Vyse were elected Fellows.—The President announced that the officers of a newly established scientific club in Vienna had written, offering the use of the club to any of the Fellows of the Society who may visit Vienna. The following communications were read: "On the Chemical and Mineralogical Changes which have taken place in certain Eruptive Rocks of North Wales," by Mr. J. A. Phillips,—"On New Species of Belemites and Salenia from the Middle Tertiaries of South Australia," by Mr. R. Tate,—and "On *Manisaurus Gardneri* (Seeley), an Elasmosaurian from the Base of the Gault, at Folkestone," by Mr. H. G. Seeley.

February 16th.—Annual General Meeting.—Professor P. M. Duncan, President, in the chair. The Secretaries read the Reports of the Council and of the Library and Museum Committee for the year 1876. The Wollaston Gold Medal was awarded to Mr. R. Mallet; the President presented the balance of the proceeds of the Wollaston Donation Fund to Mr. R. Etheridge, jun. The President next handed the Murchison Medal to Mr. W. W. Smyth for transmission to the Rev. W. B. Clarke; the balance of the proceeds of the Murchison Geological Fund was presented to the Rev. J. F. Blake. The President handed to Professor Ramsey the Lyell Medal and part of the Lyell Fund, for transmission to Dr. J. Hector, Director of the Geological Survey of New Zealand; the balance of the proceeds of the Lyell Fund was handed to the Rev. T. Wiltshire, for transmission to Mr. W. Pengelly. The President handed the Bigsby Medal to Mr. Hulke, for transmission to Professor O. C. Marsh. The President then proceeded to read his Anniversary Address. The following were elected Council and Officers for the ensuing year:—President, Professor P. M. Duncan; Vice-Presidents, Sir P. de M. Grey-Egerton, Bart., R. Etheridge, J. Evans, and Professor J. Prestwich; Secretaries, J. W. Hulke and Rev. T. Wiltshire; Foreign Secretary, W. W. Smyth; Treasurer, J. Gwyn Jeffreys; Council, H. Bauerman, Rev. T. G. Bonney, W. Carruthers, Professor W. B. Dawkins, Professor P. M. Duncan, Sir P. de M. Grey-Egerton, Bart., R. Etheridge, J. Evans, H. Hicks, W. H. Hudleston, J. W. Hulke, J. Gwyn Jeffreys, Professor J. W. Judd, Professor T. M'K. Hughes, Professor J. Morris, Professor J. Prestwich, R. H. Scott, Earl of Selkirk, S. Sharp, W. W. Smyth, Admiral T. A. B. Spratt, Rev. T. Wiltshire, and H. Woodward.

February 21st.—Professor P. M. Duncan, President, in the chair. Messrs. S. A. Adamson, W. M. Cole, T. Floyd, W. S. Gresley, E. Pritchard, J. Pryor, and J. G. Thomas, were elected Fellows. The following communications were read: "On possible Displacements of the Earth's Axis of Figure produced by Elevations and Depressions of her Surface," by the Rev. J. F. Twisden,—and "Note on a Specimen of Diploxylon, from the Coal-formation of Nova Scotia," by Dr. J. W. Lawson.

ASIATIC SOCIETY.

February 19th.—Sir E. Colebrooke, Bart., M.P., in the chair. A paper was read, communicated by Mr. E. Thomas, "On the Early Faith of Asoka," in which he fully examined the question whether Asoka was really so entirely a Buddhist as has been generally maintained, and showed, from the overwhelming testimony of his inscribed and still existing edicts, that Asoka's faith more truly exhibited three phases,—1. When he was a follower of the Jaina religion; 2. When his views were becoming modified; and, 3. When, towards the close of his life, he appears manifestly as an out-speaking Buddhist.

LINNEAN SOCIETY.

February 1st.—G. Bentham, Esq., V.P., in the chair.—Messrs. G. Boulger, A. S. Heath, and W. Meller were elected Fellows. Mr. A. W. Bennett exhibited and made remarks on specimens of insects illustrating mimicry; these had been captured in Syria by Mr. N. Godman. An unusual form of double anemone and some excessively large oak-leaves gathered near Croydon were shown and commented on by Mr. S. Stevens. Sir J. Lubbock then proceeded with Part IV. of his contributions "On the Habits of Ants," &c. By an ingenius contrivance of something of a double letter form (thus, Fⱻ), an interval of three-tenths of an inch, either by a drop from above or reaching the distance from below, was formed by withdrawal of a small cross bar. This almost inappreciable space alone prevented the ants from reaching a glass cell filled with larvæ, for they evidently had not sense or intelligence enough to surmount it, although they had for hours been traversing the route and carrying off larvæ previous to the three-tenths of an inch being left open. Industry was conspicuously shown by one specimen, which Sir John used to place in solitary confinement in a bottle for hours, and once for days; but the moment it was released it commenced larvæ-gathering, though just previously on short commons. Sir John's experiments with ants subjected to chloroform or spirit have been already related at the Royal Institution. Sir John expresses surprise that ants of one nest perfectly well know each other. Even after a year's separation old companions are recognised and amicably received, whereas strangers, particularly of *Lasius flavus*, are almost invariably attacked and maltreated, even when introduced in the mixed company of old friends. Sight cannot be acute. For example, in experiments food was placed on a glass slip a few inches from the nest, the straight road to and from the nest being soon familiar to the ants; but when the food had been shifted only a short distance from its first position, it was long ere its new site was discovered. Indeed, they wandered from a few minutes to half an hour in the most extraordinary circuitous routes, a perfect maze of cross paths, before finding out the direct road between nest and food, and *vice versa*. Slavery in certain genera is a positive institution, the Amazon ants (*Polyergus rufescens*) absolutely requiring a slave assistant to clean, to dress, and to feed them; else they will rather die than help themselves, though food be close by. A curious blind wood-louse (*Platyarthus Hoffmansegii*) is allowed house room as a kind of scavenger, but little heed is taken of it. Some new Diptera of the family Phoridæ Sir John finds to be parasitic on our own ants. A paper "On the Aspects of the Vegetation of Rodriguez" was read by Mr. I. Bailey Balfour, who accompanied, as botanist, the Transit of Venus Expedition in 1874. It is seems that, like the the Flora of St. Helena, that of Rodriguez has suffered great changes, partly by human and other agencies. It is insular, dry, and temperate, rather than humid and tropical in character. The facies is predominantly Asiatic, though forms of Mascarene type, and even Polynesian and American forms, are sparsely met with. The leaves of many plants exhibit a heteromorphism of a marked kind, and this Mr. Balfour described with fulness, remarking that while as a whole in degrees and kind variable, yet among species leaf variation is pretty uniform. "The Fungi of the Challenger Expedition (third notice)," by the Rev. M. J. Berkeley, and "On Steere's Tropical Ferns," by Prof. Harrington, U.S., were papers announced and taken as read.

February 15th.—Prof. Allman, President, in the chair.—Prof. W. Harrington, Messrs. W. Burns, E. T. Gardner, J. W. S. Meiklejohn, the Rev. J. Stobbs, and Sir C. W. Strickland, Bart., were elected Fellows. There was exhibited under the microscope, by Mr. A. Lister, the plasmodium of one of the lowly organized Myxomycetæ. This protoplasmic mass demonstrated the peculiar amœboid movements, and the occasion gave rise to an animated discussion on its contested animal or vegetable nature. Two botanical papers were read, "On the Rootstock of *Marattia fraxinea*, Sm.," by Mr. J. Buchanan; and "On the Algæ collected at Rodriguez during the transit of Venus Expedition, 1874," by Prof. Dickie. The Marattia is chiefly found in the northern part of New Zealand. The Maories use it as food, but do not cultivate it systematically. They say when smashed the pieces thrown on the ground spring up freely, and thus it has increased. At Wellington, where transplanted, it grows luxuriantly when placed in rich, damp soil. Mr. Buchanan has now studied its mode of growth; he considers the rootstock as resembling a scaly bulb more than a fern rhizome, and likens its propagation to that of the potato, though modified. Its growth is very slow; hence, probably, its scarcity. The freshwater Algæ of Rodriguez point in an Asiatic direction; none are African species, while some have rather a world-wide distribution. The sec-read a "Note on a new Example of the Phyllodocidæ (*Anaitis rosea*), by Dr. W. C. McIntosh. This marine worm was obtained at St. Andrews. It is one inch and a half long, with relatively broadish body, blunt snout, and small eyes. On head and body it is slashed and speckled with pink, which merges into a yellow band behind. A communication was read "On Deep Sea Anemones (Actinaria) dredged from on board the *Challenger*, with a description of certain Pelagic Surface-swimming Species," by Mr. H. N. Moseley. The occurrence at great depths of representatives of ordinary shallow water forms of actinia is of profound interest. A species of Edwardsia, from 600 fathoms, has undergone but trifling modification from the littoral form. The Cerianthus, from 2,750 fathoms, is dwarfed, but uncommonly like its shore brethren. Thus, it appears, one kind is found in shallow water at the Philippines under the full glare of the tropical sun, while another species of the same genus exists at three miles' depth, where solar rays never penetrate, and the water keeps at freezing point. The fact of the deep-sea anemones retaining vivid colouring in their dark watery abode is a point of special value as connected with certain other generalizations. The new genus Corallinomorphus likewise possesses interest, both on account of being a near ally to certain of the simple discoid corals, and of it having the largest stinging cells (nematocysts) yet recorded. An extract of a letter on the marsupial pouch of the Bandicoot, by Mr. R. D. Fitzgerald, was briefly adverted to by the secretary.

CHEMICAL SOCIETY.

FEBRUARY 15TH.—Dr. Gilbert, V.P., in the chair.—Dr. Dupré read a paper "On the Estimation of Urea by means of Hypobromite," in which he described a new form of apparatus and certain modifications in details of Russell and West's process.—The other papers were: "On a New Carbometer for the Estimation of Carbonic Anhydride," by Mr. S. T. Pruen and Dr. G. Jones, being a modification of Scheibler's calcimeter,—"On the Influence exerted by Ammonium Sulphide in Preventing the Action of various Solutions on Copper," by Mr. F. W. Shaw and Dr. T. Carnelly,—"An Experimental Inquiry as to the Changes which occur in the Composition of Waters from Wells near the Sea," by Mr. W. H. Watson,—"On the Solvent Action of various Saline Solutions upon Lead," by Mr. M. M. P. Muir,—"Derivatives of Di-isobutyl," by Mr. W. C. Williams,—and "Notes on Madder Colouring matters," by Dr. E. Schunck and Dr. H. Roemer.

ZOOLOGICAL SOCIETY.

FEBRUARY 20TH.—Prof. Flower, V.P., in the chair.—Mr. O. Salvin exhibited a series of drawings taken during Hunter's voyage to Australia in 1788-92, wherein Duke of York Island as it then existed was depicted, together with various objects of natural history. Papers and communications were read: from Prof. Owen, containing an account of some additional evidence recently obtained of the former existence of extinct birds allied to the genus Dromornis in Australia,—by Mr. Sclater, "On the Birds collected by the Rev. G. Brown on Duke of York Island and on the adjoining parts of New Ireland and New Britain;" eleven species were described as new to science, amongst which were a new Kingfisher, proposed to be called *Tanysiptera nigriceps*, and a new Pigeon, to which the name *Macropygia Browni* was assigned,—by Dr. G. E. Dobson, "On a collection of Bats collected by the Rev. G. Brown in Duke of York Island and the adjacent parts of New Ireland and New Britain;" amongst these four were considered to belong to undescribed species, and one of these to a new genus of the Frugivorous Bats, proposed to be called Melonycteris,—by Mr. E. R. Alston, "On the Rodents and Marsupials collected by the Rev. G. Brown in Duke of York Island, New Britain, and New Ireland:" the species, six in number, were either identical with New Guinea forms or nearly allied; for the three new species the names of *Mus Browni*, *Uromys rufescens*, and *Macropus lugens* were proposed,—by Messrs. O. Salvin and F. Du Cane Godman, "Description of a Collection of Lepidoptera made by the Rev. G. Brown on Duke of York Island and its Neighbourhood;" the series of Butterflies contained 26 genera and 40 species, while in that of the Moths 11 genera were represented by 14 species,—by Mr. E. J. Miers, "Description of the Crustacea collected by the Rev. G. Brown on Duke of York Island:" the collection, with one exception (*Lysiosquilla arenaria*), belonged to the Decapoda, and contained in all 44 specimens, representing 16 species: although none of the species were new to science, several were interesting and little known forms,—by Dr. A. Günther, "On a Collection of Reptiles and Fishes made by the Rev. G. Brown on Duke of York Island, New Ireland, and New Britain:" of nine Lizards represented in the collection, one was described as new, and of eleven Snakes three were considered to be hitherto unknown; amongst the latter was a new genus and species of Erycidæ, proposed to be called *Erebophis asper*,—and by Mr. H. W. Bates, "On the Coleoptera collected by Mr. G. Brown on Duke of York Island, New Ireland, and New Britain:" the collection comprised 44 species, and contained some of the finest species of the New Guinea Fauna. Amongst these were many examples of a new Longicorn, proposed to be called *Batocera Browni*, after its discoverer.

STATISTICAL SOCIETY.

FEBRUARY 20TH.—J. Heywood, Esq., President, in the chair.—Mr. C. Walford read a paper "On Fires and Fire Insurance, considered in their National Aspects."

. ENTOMOLOGICAL SOCIETY.

JANUARY 17TH.—*Anniversary Meeting.*—Sir S. S. Saunders, V.P., in the chair. An abstract of the Treasurer's account and the Report of the Council of 1876 were read. The following Officers and Council were elected: Prof. Westwood, President; J. J. Weir, Treasurer; Rev. T. A. Marshall, Librarian; Messrs. F. Grut and R. Meldola, Secretaries; Prof. Westwood, Sir S. S. Saunders, Messrs. H. W. Bates, Champion, Dunning, Grut, Meldola, Stainton, Weir, Douglas, E. Saunders, Rev. A. E. Eaton, and Rev. T. A. Marshall, Council. The President, in consequence of an accident, was prevented from attending, and the delivery of his Address was unavoidably postponed till the next meeting.

February 7th.—Prof. Westwood, President, in the chair. W. D. Roebuck, Esq., of Leeds, was elected a subscriber. The President nominated Messrs. J. W. Douglas, J. W. Dunning, and H. T. Stainton as Vice-Presidents for the ensuing year. The President delivered the Address, postponed from the last meeting, "On the Progress of Entomology during the Past Year." Mr. F. Bond exhibited a specimen of the North American butterfly, *Danais Archippus*, taken in September last, near Hassock's Gate, Sussex, being the third specimen taken in this country. The President exhibted a specimen of the singular butterfly, *Bhutanitis Lidderdalii*, Atkinson, from Bhotan. He also read a letter, which he had received from Baron v. Osten-Sacken, referring to his paper "On the Dipterous Genus Systropus," published in the last part of the *Transactions* of the Society, in in which he had stated that a species from Natal (*S. crudelis*) had been bred from a cocoon resembling that of Limacodes, and pointing out that *Systropus macer*, the common species in the United States, had been bred from the cocoon of *Limacodes hyalinus*, and it was a remarkable instance of community of habit among insects of the same genus in far distant regions. The President read some remarks he had received from Mr. J. Olivier, respecting insects of the dipterous genus Bombylius, frequenting the nests of a bee of the genus Anthophora at Pompeii. Mr. M'Lachlan exhibited a case of a Lepidopterous larva sent by Dr. Kirk, of Zanzibar, who had found it on a species of Mimosa. He considered it to be allied to Psyche and Oiketicus; and it was remarkable on account of its form, which bore a striking resemblance to that of a flattened Helix. It appeared to be constructed of a substance resembling papier mâché, with a smooth, whitish external coating. Mr. C. O. Waterhouse exhibited some remarkable varieties of British Lepidoptera, viz., *Chrysophanus phloeas*, *Polyommatus Adonis*, *P. Alexis*, and *Agrotis exclamationis*. Dr. B. White forwarded an extract from the *Medical Examiner* of the 21st of December last, containing an account, by Dr. T. Fox, of an extraordinary case of "pruritus," which afflicted every member of a family, and household, including even the dog and cat. A specimen of the insect causing it had been submitted to Dr. Cobbold, who pronounced it to be a species of Trombidium, which was believed by Dr. Fox to have originated from certain plants in the garden, and that the cat and dog, which appeared to have been the first affected, were agents in conveying the parasites to the human members. The following papers were read: "Notes on the African Saturnidæ in the Collection of the Royal Dublin Society," by Mr. W. F. Kirby,—"Descriptions of new Genera and Species of Phytophagous Beetles belonging to the Family Cryptocephalidæ, together with Diagnoses and Remarks on previously described Genera," and "Descriptions of new Species of Phytophagous Beetles belonging to the Family Eumolpidæ, including a Monograph of the Genus Eumolpus," by Mr. J. S. Baly.

ANTHROPOLOGICAL INSTITUTE.

FEBRUARY 13TH.—Mr. J. Evans, President, in the chair.—Miss Buckland read a paper "On Primitive Agriculture," in which the value of the study of the subject was explained, as determining migrations, &c., of nations, in pre-historic times. The origin of the cereals is still obscure, and maize, which is considered indigenous to the new world, and unknown in Europe before the time of Columbus, was, in the opinion of Miss Buckland (based on the reports of recent travellers in Africa, Madagascar, New Guinea, China, &c.), cultivated by peoples which have never had intercourse with Europeans. In America, China, and Ancient Egypt there are traces of a time anterior to that of the cultivation of the cereals; and a similarity of myths, customs, &c., of China, Egypt, Peru, and Mexico, leads to the conclusion that an allied pre-Aryan race introduced cereals into all these countries. In the discussion, Mr. B. Dawkins, the President, and others took part. Mr. Hyde Clarke exhibited some weapons from the Amazon river, on which Mr. Franks and others remarked. Lord Bonehill exhibited a collection of flint weapons, objects, &c., from Honduras. The President, Mr. Blackmore, Mr. Franks, and others spoke on the subject.

PHYSICAL SOCIETY.

FEBRUARY 17TH.—Prof. W. G. Adams, V.P., in the chair.—Mr. T. W. Philips was elected a Member. Professor Guthrie exhibited for Mr. C. J. Woodward an apparatus he has devised for showing to an audience the interference of transverse waves. Mr. S. P. Thompson exhibited some galvanometers in the form of magic lantern slides, which he has arranged for exhibiting their indications to an audience. Mr. Wilson showed an arrangement for exhibiting convection currents in heated water. It consists of a small glass cell, with parallel sides. In the base of the wood dividing the sides is cut a slight depression to expose a brass tube, which traverses it horizontally, and is open at one end, while the other is bent at right angles, and connected with a flask containing water. The brass tube where it is exposed in the cell is surrounded with a jelly formed of gelatine, containing rose anniline, and the cell is filled with water, and projected on the screen. When the tube is heated by boiling the water in the flask, the jelly is liquefied, and the liberated colouring matter rises in the water, showing the direction of the heated current. Professor Guthrie exhibited an arrangement he has been using with a view to determine the vapour tension of water, and explained the difficulties to which such a determination is liable, and the manner in which his apparatus has so far failed. Prof. Guthrie then showed the manner in which electricity is distributed on non-conductors, such as the plate of an electrophorus, by placing it for a given time beneath a point connected with a charged Leyden jar, and subsequently sprinkling a mixture of sulphur and litharge over it. It was shown that the diameter of the circle formed below the point after the superfluous powder had been removed, is not purely a function of the distance between the point and the plate, but is mainly influenced by the conductivity of the material, and further, that if the point be directed obliquely towards the plate, the circle formed is very slightly elliptical, but the ellipticity is in no degree proportionate to the obliquity of the point; and, finally, he showed that if the non-conducting plate of an electrophorus be written upon with a metal, and sprinkled with the above mixture of sulphur and litharge, the former or latter adheres according to the nature of the metal used.

TELEGRAPH ENGINEERS.

FEBRUARY 14TH.—Prof. Abel, President, in the chair.—The paper read was, "On Shunts and their Applications to Electrometric and Telegraphic Purposes," by Mr. W. H. Preece. At the conclusion of the meeting, over fifty candidates were balloted for, for admission into the Society.

METEOROLOGICAL SOCIETY.

FEBRUARY 21ST.—Mr. H. S. Eaton, President, in the chair.—Messrs. W. Adams, T. Black, R. W. Munro, and Dr. R. B. Wallcott, were elected Fellows, and M. U. J. Le Verrier an Honorary Member. The President gave an inaugural address. After referring to the various theories advanced to account for changes of climate, he observed that, in drawing deductions from a long series of observations of the temperature of the air, it is important to ascertain whether the conditions of the surrounding district have altered. Otherwise, changes in reality due to local causes may be erroneously assigned to secular variation. The climate of London has thus been modified by the consumption of fuel and the vast population. He estimated that the heat developed from the present annual consumption of 5,000,000 tons of coal on the metropolitan registration area of 118 square miles, and from all other artificial sources, would suffice to raise the temperature of a stratum of air 100 feet in depth resting on that area, 2° 5 every hour. The effect of the growth of the population of London from 900,000, at the commencement of the century, to 3,500,000 at the present time, and of the still greater increase in the comparative consumption of coal, was manifested by the rise in the average temperature of the air at the Royal Observatory, Greenwich, which place was year by year becoming more surrounded by a net-work of houses and population. For this reason, Greenwich was not a suitable place for a Meteorological Observatory of the first order. Mr. Eaton subsequently referred to some of the practical difficulties experienced in pursuing the study of dynamical meteorology. The following papers were read:—"Barometrical and Thermometrical Clocks for Registering Mean Atmospheric Pressure and Temperature," by Mr. W. F. Stanley; "Solar Thermo-Radiometer," and "On an Improvement in Minimum Thermometers for Terrestrial Radiation," by Mr. J. Hicks.

SOCIETY OF ARTS.

FEBRUARY 16TH.—The Earl of Northbrook in the chair. The paper read was "On Indian Railways," by Mr. J. Danvers.

February 21st.—Lord A. S. Churchill in the chair. Fourteen new Members were proposed for election. Sir J. Lubbock delivered the first of a series of science lectures, of which the rest will be given at intervals during the session. The subject was "Certain Relations between Plants and Insects," and the lecture was a continuation of the address delivered by Sir J. Lubbock on the same subject.

February 28th.—The Rev. M. Pattison in the chair. Twelve new Members were proposed for election. The paper read was "On Middle Class Education in Holland," by Dr. Yeats.

QUEKETT MICROSCOPICAL.

FEBRUARY 23RD.—H. Lee, Esq., President, in the chair. Four new Members were elected. A paper was read by Dr. M. C. Cook, "On Black Moulds" (Dematici), in which he gave the generic characters of the various kinds of which the order is composed, and described their distinctive features by the aid of diagrams and a large number of coloured drawings. The paper was concluded by some practical observations as to the collection, examination, and preservation of this class of objects, and was further illustrated by typical species exhibited under the microscope.

NUMISMATIC SOCIETY.

FEBRUARY 15TH.—J. Evans, Esq., President, in the chair.—Mr. Vaux exhibited a gold coin of Diodotus, King of Bactriana; Mr. Neck two milled half-crowns of Charles the Second, dated 1673, with a plume under the King's bust, one of them also with a plume in the centre of the reverse, both pieces of extreme rarity, that with the plume on the reverse probably unique.—Mr. F. W. Madden communicated the first portion of a paper "On Christian Emblems," on the Coins of Constantine the Great, his Family, and his Successors." Mr. C. F. Keary read the first of a series of papers "On the Numismatics of the Transition Era from the Fall of the Western Empire to the Crowning of Charleymagne as Emperor, A.D. 800." Mr. Keary began by discussing the condition of the coinage in Europe about the time of the accession of Honorius, and, from an examination of the laws, national poetry, &c., of the various Teutonic peoples, showed what were the substitutes for a coinage among them. Proceeding to the era of the barbarian invasions, the writer was of opinion that a large proportion of the coinage in each invaded territory, becoming diverted from its proper uses, was employed only to pay taxes or tributes to the German conquerors, and was by them frequently converted into bullion or ornaments. Gold being the metal especially prized, Mr. Keary contended that the chief use of a gold coinage now became the paying of these taxes, while the money in the baser metals alone remained current among the earlier inhabitants. He next examined the earliest coinages of the various barbarian invaders, Burgundians, Visigoths, Vandals, &c., consisting of mere barbarous imitations of the Imperial coins, especially of the aurei.

FOREIGN SCIENCE.

The application of the Morse alphabet to sea-signalling is recommended for adoption by the French authorities. *Cosmos* remarks upon Professor Tyndall's account of the modification of Captain Colomb's system, in which bursts of light are used; (the system customary in the Army and Navy). It consists in substituting long and short eclipses, except for great distances, when the magnesium lamp is made use of. The inventor thinks that even in these circumstances little exercising would promptly obtain correct interpretations of the signals. Experience has proved, it is stated, that a person familiar with the system of bursts of light, can use the eclipse system with the same facility. This publication sets forth that M. Henri Beegnezzl, who has given in to the Academy of Sciences a valuable memorandum on "Rotatory Magnetic Polarisation," including new studies in the phenomena, discovered by Faraday in 1845, has just married the daughter of M. Jamin, a "doubly academic marriage." M. Chasles has just presented to the Academy from Prince Boncampagni, the parts for September and October, 1876, of the Bulletin of Bibliography of the History of Mathematical and Physical Science. It contains notes by the Prince of the works of the recently deceased German geometrician, Godefroi Friedjein.

Some of the first numbers of the *Correspondance Seientifique*, published at Paris, have been forwarded to us. It comprehends a summary of the proceedings of the *Academie des Sciences*, and scientific news, and it is a novelty in its way, being lithographed in four closely engrossed unmarked columns, on a sheet of paper about $1\frac{1}{4}$ feet by $1\frac{3}{4}$ feet. It would appear that greater order is much needed in the Academy. Our special contemporary narrates that at the sitting of the 12 ult., "M. Dumas, a secretary, unrolls the correspondence in the midst of such a noise that it is impossible to hear what is transacted." And, then, towards the end, that "M. Chasles begins reading a note, but the learned academician refuses to continue reading, in spite of the urgent requests of the President!" Also that 2nd and 3rd class railway passengers have a chance next year of having their condition benefited through the system of warming these carriages of M. Smile Gautard, in which the Marshal President was much interested at the Agricultural Exhibition recently held. This ingenious apparatus gives a constant heat of 15 to 16 degrees to the compartments by means of the steam lost from the engine. It is proposed influentially to secure a Government Commission, with view to the application of the system next winter. The *Correspondance* says gaily, "Cheer up—poor travellers, second and third—a little patience! blow still upon your fingers, it is for the last time! your misfortunes are about to end!" We hope so; and for Great Britain as well, and specially on the night trains from London to the North. The present contrivances in use hardly do more than make our wants more felt, which is no news.

M. Coquillon has tried his *Grisometre*, or fire-damp measurer in several wells of Saint Etinene, and obtained every exact results; thence it was hoped by attentive study of the distribution of the *grison* in a mine to obtain a more extended ventilation, and prevent grave accidents. One of these machines can work in the mine itself, the other, which controls the first a little, remains in the engineer's room, who can follow the course of the fire-damp in a gallery, and take precautions. M. Coquillon's plans produced a great sensation.

The members of the Alliance Company, the creator of the electric light and its useful application, a company fallen into oblivion, have decided on reorganisation. This is cheering intelligence. Unfortunately the financial means had not been sufficient. The society formed under the skilful direction of M. Berlioz began to fall off in 1874, and sustained blows such as launching 250,000 francs of its obligations upon the market at a time when it was completely invaded by one of the most considerable loans which France has tried. So says *Les Mondes*. Amongst novelties, Mr. Yates' (of Manchester) invention of a new horse shoe is commented on. It seems that the Russian cavalry are thinking of adopting it. The shoe is composed of three thicknesses of ox-hide or buffalo compressed in a metal mould, and then submitted to chemical action. It lasts longer and weighs four times less than the iron one. Even on asphalte horses will not slip. A sugary matter has been produced in course of applying water to the leaves of the nut-tree, which has been christened *Nucite*. Whether this is to be a sugar-plum or some other form of eating or drinking is not stated. A new method of obtaining oxygen in abundance is by action of bi-hypermanganate of potash upon bi-oxyde of barium treated with water. Bellon, nephew of the celebrated Daguerre, advertises his photographic apparatus, photography on wood for engraving, and electric lighting for soirees. Our Scotch readers may note a statement in reference to an inaccuracy in Littré's Dictionary about "granite." The word, contrary to the view of Virlet D'Aorst, is not French, but revised from the Italian word *granita*, which is derived from grana, grain in English, and French. The study of derivation of words is very essential to the progress of science, however difficult it may be.

In regard to the popular subject of warming, ventilation, &c., it is stated that each of the cells of Swedish prisons is provided with apparatus for warmth and ventilation as we would infer, differing from a general system of hot-water pipes. This is so much the case, that the instances of malady and disease are under the mean of free men. The law proscribes a sufficient ventilation of all places destined to contain a great collection of individuals, including theatres. Dr. Prinzköld avows that if churches are rarely and badly ventilated in Sweden, it is not the same with hospitals. New hospitals containing all the ameliorations of which such constructions are capable, are to be built. The heating of some of the new ones is by conductors of hot-air; for every individual there is admitted 25 cubic metres of air. In schools every child must have a space of 1·52 square metre, and a cube of air of 5·250 to 7·850 cubic metres. As for the position of the windows, it is admitted on principle that children should be lighted from the left or from the left and back. The number of *Les Mondes* of 8th ultimo, gives a fourth note on the Theory of the Radiometer, being an extract of a letter from Mr. W. Crooke. For some years the use of agricultural meteorological warnings has proceeded with regularity. Each Commune is recommended to obtain an agricultural barometer, and place it within public inspection like the marine barometers, in order that its indications may aid the interpretation of telegraphic despatches. To obtain this a post office order for 20 francs—a little less than a sovereign—must be sent to the agent, secretary of the Scientific Association of France, 113, Boulevard St. Michel. If the barometer has been given by an inhabitant of the country, and the Commune wishes to make known his name, the constructor engraves "given by M.————." For 15 francs more an oak box, with key, can be had for the installation of the barometer and fixing the despatch.

ESPIR'S EXPLOSIVE COMPOUND.

AT the Inventor's Institute, Feb. 22nd, 1877, Sir Antonio Brady, President in the chair.—A paper on a new explosive for quarrying mining, and colliery purposes was submitted to the meeting by the inventor, Mons. Camille Espir, a French gentleman, upon which a very practical and interesting discussion took place, as hereinafter reported Statistics of a *series* of important experiments to various adaptations in different quarries and stratifications which had been conducted by Captain Julius Roberts, Royal Marine Artillery, and fully and practically tested by him, were laid upon the table, shewing its capabilities at least under the above heads of quarrying mining, and colliery purposes if *not totally*, yet to a very *great extent* to supersede the reckless and dangerous uses of ordinary gunpowder, of dynamites, nitroglycerines, or gun cottons. It appears these experiments were conducted at various quarries near Plymouth, with the sanction and approval of the owners, and with such secure complete and satisfactory results as to their support and the promise of its adoption. Quarry owners, their gangers and quarrymen, are more or less suspicious of any innovations, even upon gunpowder, to which they and their generations before them have clung with a fatality which would appear to show that quarrymen, miners, and colliers, as a class, are utterly reckless of life. But in the instances of the experiments conducted near Plymouth, the quarry owners, their employés, and numerous scientific and practical gentlemen who witnessed them evinced the greatest interest in the introduction of such an explosive, which not only professed but proved itself to be perfectly harmless in handling (even by the most careless)—one exempted from all risks of explosion either in its loose state or packed for storage or carriage,—undeteriorated by damp, and when damp, by any want of ordinary care, can be dried, depriving it of none of its qualities—that will only *simply* and *slowly burn away* (this was illustrated by igniting some at the meeting) so that it can be readily extinguished by any thing available such as sand, or earth, or water thrown over it. That no amount of friction, spontaneous, combustion, or detonation by pounding it between stones, or stones and iron, will cause ignition.

These were the crucial tests to which the new explosive were submitted at those experiments (and which were explained by Captain Roberts at the meeting), and in every instance fulfilled the desired conditions, the tabulated series having the signatures of those present.

The trials were carried out in the various sections day after day, the "bore holes" being those intended and prepared for ordinary gunpowder, charged and "tamped" with dry clay rubble in the same way, the difference being that in the case of the new explosive it is gradually poured down and itself rammed hard and compact before the ordinary tamping, and in this specially consists its powerful explosive character. It is ignited by fuze, needle fire, or battery. A pleasing impression upon the tympanum of sensitive ears is that the sound of the explosion is soft and booming in great contrast to the sharp report of other explosives. The expansion of its gases on ignition are somewhat slower and in much greater volume, and this may in part account for the "upheavals" and "out-throwings" of far heavier and more completely detached masses of material.

A concise form of abstract from the tabulated series of experiments will suffice to show its operations and results. It is bulk for bulk double for the same weight of gunpowder, and was so used measure for measure in the experiments (in several cases even less), and so with 25lbs. of the new explosive as compared with gunpowder divided amongst some 23 firing charges in various depths of holes from 1 foot "eggholes" to others of 10 feet, and various diameters from 1" to 2½" mases of rock were thrown out with better practical results and in far greater quantities that twicce the bulk of gunpowder would have effected; and in some of the deeper holes, where a repetition of gunpowder charges, technically termed *second* and *third* fires, would have been necessary, a better result was obtained by the simple first charge of the new explosive. It was estimated and verified by experienced quarrymen that the 25lbs. so expended threw out upwards of 2,000 tons! of rock in the 23 firings.

These experiments elicited a further important consideration, that of breaking up the "ore" or other rocks into small masses or lumps, which dynamites aim at in mining purposes as being more ready for the stamps or crushers, or in excavations where the lumps are easily handled and wheeled away; the object being to almost reduce the mass to rubble. Captain Roberts has this matter practically before him, and sees the object can be obtained by varied applications of the explosive, and not only in this particular but his attention has been devoted to torpedo and other bursting charges, and its possible adaptability to artillery and cartridge uses.

We know that dynamites and other such explosives effect a high amount of shattering and disintegration in hard rock or "ore" grounds, in which with all their attendant expedition of machine borings (which are equally applicable to the new explosive) *versus* the time-honoured "jumper" and the "pick" and "gad," still carry with them the most frightful risks and uncertainty in handling. And after all is a commercial question of how much can be done with the least outlay and the greatest risk and sacrifice of human life not put into the scale.

Captain Roberts explained the simple method of manufacture and the apparatus employed. The invention, according to the specification of Mr. Espir's patent, consisting in properly mixing 60 per cent. of refined nitrate of soda, 14 per cent. of refined and triturated brimstone, and 26 per cent. of sawdust from strongest wood, such as oak, walnut, rosewood, &c., and to increase (when desired) the explosive power 5 per cent of nitrate of soda to be added. It can be sold at 3½d. per lb. against 4½d. and 5d. per lb. for gunpowder; but as half the quantity is sufficient compared with a pound of gunpowder, its relative comparative cost is as 1¾d. worth, against 5d. worth of gunpowder.

A factory is in course of erection near Plymouth, the site provided, and plans and details ready for manufacture, and to supply the neighbouring quarries and mines, and other engagements entered into in the two counties of Devon and Cornwall, to which this factory will be only at present in its dimensions adapted. It is to be a model one, and a basis of working out and practically testing such extended applications and uses as are contemplated by Captain Roberts, and such modification carried out either to enlarge upon its manufacturing capabilities thereat, if found expedient, or to supplement it by similar erections in other districts throughout the kingdom, which doubtless will be found the best and cheapest system of localizing its operations in certain centres of quarrying, mining or colliery districts.

A well merited and cordial vote of thanks was passed to Mons. Espir, for having introduced his invention to the notice of the Institute.

In the discussion on this invention, Admiral SELWYN remarked that the invention appeared to aim at very important objects, namely, to produce powder which should not, as common gunpowder did upon explosion, either suffocate or create headache. He thought Mr. Espir would secure very beneficial results by continuing his investigations of this subject. Mr. SMARTT, Mr. F. H. VARLEY, and the Secretary, Mr. F. W. CAMPIN, also took part in the discussion, which elicited much of the above information.

CHEMISTRY OF THE PAST YEAR.

The old proverb, that there is nothing new under the sun, seems quite out of date when we look at the scientific records of a year, and especially as we glance over the chemical discoveries that have been made or published in that brief space of time. Rudolph Wagner, one of the German members of the Centennial jury on chemistry, aided by a dozen or more able assistants, publishes annually a brief but careful abstract of all that has been accomplished in chemical technology for the year. These brief notices fill a volume of over eleven hundred pages. The amount of chemical work performed in each year which does not fall under this title would fill another volume of equal size. It is not our intention to undertake the compression into a brief editorial of all the contributions that have been made to chemistry within the year just closed, but only to point out a few interesting facts, omitting in some cases, perhaps, others quite as important for want of time and space. Nor shall we undertake to arrange them in the order of their importance, for it is strangely true that discoveries which seem trifling often prove of immense value, while those which attract most attention at first are soonest forgotten.

INORGANIC CHEMISTRY.—The discovery of the new metal gallium marks an important epoch in chemical chronology, not alone on account of its peculiar properties, its low melting point, &c., but more as being the first element whose discovery had been predicted, and thus bringing into prominence the almost forgotten laws laid down by Mendelejeff several years previously. This metal, its discovery, its spectrum, and other properties have been fully described in our columns.

Although gallium is the last brilliant triumph of the spectroscope, many of its other achievements have been of great practical value. Professor H. Vogel, of Berlin, has done a vast amount of valuable work in devising methods of detecting adulteration, especially in wine, by means of the absorption spectra. He even adapted it to the detection of some metals of the iron group, and more recently to the salts of aluminum and magnesium, when in very dilute solutions, bringing to his aid an organic colouring matter, purpurine, the absorption spectrum of which is variously modified by these metals. The subject of the detection of blood, even when old and dry, by means of the spectroscope, has also been studied by Vogel, who points out a certain method of distinguishing it from indigo, with which some have claimed that it may be confounded. It may be here remarked that Struve has obtained from some kinds of meat a substance which also yields the same absorption spectrum as blood, from which, however, it can be distinguished by other reactions. Following the path of Professor Vogel, another German, named Wunder, has studied the absorption spectra of different kinds of ultramarine, including the green and violet, as well as the blue. Reimann states that the spectroscope is a good instrument for the detection of mixtures of coal-tar colours. He has published, in his *Färber Zeitung*, the position of the absorption bands of several of the best known colours. Thus the spectroscope seems likely to prove exceedingly useful in organic chemistry, especially for distinguishing dyestuffs and detecting adulterations.

Many of the rare metals have been carefully studied during the year, and new properties discovered and new uses devised for them; and as each in turn becomes more valuable in the arts, new sources of it are being discovered. This is strikingly true of vanadium—a metal known since 1830, and yet so rare as to sell for 300 dols. per ounce—which has found a use in the manufacture of aniline black. It is now the subject of much study at home and abroad. Gerland has studied its sulphates; Crow, its tetroxide; Guyard, Rosenstiehl, and others, its action in producing aniline black; while Dr. I. Walz, of this city, has rendered valuable service by pointing out a new source of this metal—in American magnetites, where the quantity is often quite considerable, sometimes 0·3 per cent. Mr. C. M. Stillwell, continuing the search, found vanadium, but in smaller quantities, in hematites and other secondary iron ores.

Platinum and the metals associated with it have been the subject of study in France. Boussingault has made it combine with silicon, as has also Guyard; while Meyer has investigated its catalytic action, and Zdrawkowitch has devised a new method of making platinum black. It consists in mixing together 15 parts of glycerine and 10 parts caustic potash of specific gravity 1·08, heating to boiling, and adding 5 parts dilute perchloride of platinum. Among the new alloys proposed is one by Schmitte, which contains platinum, copper, and tungsten, and resembles 18 carat gold. Daubrée has produced an alloy possessing the most intense magnetic polarity by adding to fused platinum one forth its weight of iron. Osmium, long known as the most poisonous metal, has been found by Déville and Débray to be the heaviest metal, its density being 22·577 times that of water. Cæsium and rubidium, the two eldest children of spectroscopic research, and rarest of the rare, have been the subject of careful study by F. Godeffroy, who has determined their atomic weights, besides making a silicotunstate of each. Thallium, also born of the spectroscope, but most abundant of this class of bodies, has received the attention of Nietzki, Krausi, and Muir. The two former were chiefly interested in the preparation of the metal, the latter of the chlorate. Krausi speaks of having made 23lbs. of thallium from soot by simply leaching out, precipitating as chloride, and reducing with zinc. Indium, the next born, and, excepting gallium, the last, has received but little attention, except from Professor Cornwall, who has chased it through all the new blendes he could lay hands upon, and with some success.

The rare metals of the earth, cerium, lanthanum, and didymium, have been prepared and studied by Hillebrand and Norton, while Rammelsberg has determined anew the atomic weights of cerium and yttrium. Columbium and tantalum, fast friends and companions, have been examined by Jolly and Santesson, and some new compounds have been prepared. Zirconium, titanium, glucinum, and uranium have likewise received attention. Selenium has recently acquired a new importance from its sensitiveness to light, and Dr. Siemens has devised an electrical eye that will wink in the bright sunlight and open in the dark. This peculiar property of selenium promises to be of use in the manufacture of photometers. It is the crystalline form only in which the electric conductivity varies with the illumination. As selenium is found abundantly in the soot of certain sulphuric acid works, and is not difficult of preparation, its price will no doubt fall as soon as it is introduced into some practical use. It now sells for 4 dols. per oz. The researches of Pieverling on the organic compounds containing selenium prove it to be, like sulphur and tellurium, sometimes a diad, and often a tetrad. Tellurium has been brought somewhat into prominence recently by the discovery of large quantities of it in combination, as usual, with precious metals, both in the West and Chili. No use has yet been devised for it, and the terrible odour that its compounds impart to those experimenting with them have, perhaps, frightened chemists who delight in social enjoyment. Kastner advises the use of grape sugar in the quantitative analysis of telluric compounds. Becker has prepared pure tellurium, and studied and described some tellurium compounds, such as the tartrate and tri-ethyl-iodide, as a platium compound.

Dr. Vogel has continued his experiments in regard to the action of light of different colours upon the bromide of silver. Among his many remarkable discoveries, we may here only mention one. A plate coated with bromide of silver and a thin film of naphthaline red was very sensitive to yellow, that very non-actinic light, provided an excess of nitrate of silver were employed; if an excess of bromide of potassium were used, it was sensitive to blue and violet only. These interesting experiments were interrupted by his appointment as one of the German jury at the Centennial.

The action of water and saline solutions upon copper, a subject on which very little was previously known, has been carefully investigated by T. Carnelley. Dr. A. Wagner has also examined the action of saline solutions, both hot and cold, upon tin, copper, zinc, and other metals. Kaiser, who has investigated the action of sea-water on lead, reports that the lead soon became coated, and was then protected. Balard is of the opinion that it is the oxygen of the air dissolved in water which causes it to attack lead, even when salts are present in small quantities.

Hardened glass continues to attract attention, but little now can be said of it. The generally received impression is that it is the familiar phenomenon of the Prince Rupert drops on a large scale; the glass, being under tension, sometimes explodes violently.

In manufacturing chemistry and technology, there is not much which is radically new to record. Improvements rather than revolutions have been the order of the day in inorganic chemistry. The ammonia soda process is slowly gaining headway; the De Hemptinne sulphuric acid process is not yet in practical operation; many things are kept as trade secrets, and hence the world knows nothing of them for years. S. Lupton proposes a new method of making nitrogen, namely, by allowing air to bubble through strong aqua ammonia and then passing it over heated copper. The action is continuous and the nitrogen pure, an important point if it is to be employed for medical purposes. Dr. Steinbrueck states that tuberculosis, in the first and second stages, may be cured by the inhalation of nitrogen.

Organic chemistry has so many triumphs to record that we must delay a review of them until our next issue.—*Scientific American.*

TORPEDO VESSELS.

The *Thornycroft Torpedo*, a little vessel, is almost submarine. A very small part of it is above water, but of sufficient size to carry engines and two lateen sails, and it has been worked by a lieutenant, two engineers, and a pilot. The French Admiral had two disabled ships at Cherbourg in succession towed out to sea at a speed of 14 knots an hour. The *Thornycroft*, however, was able to go at a rate of 19 knots an hour—a rate not attained by any vessel in the Squadron. She very soon caught up her prey, delivered her blow with a torpedo which projected from her bow, and rebounded. "A rent as big as a house" was made in the side of the ship attacked, and she sank at once. The *Thornycroft* only spun round and round for a few moments, and then returned uninjured to the Squadron from which she had started. A vessel of this kind is scarcely discernible in the water; even if she were detected, she is so small that it would be difficult to hit her; and half-a-dozen *Thornycrofts* attacking a large vessel would be a most dangerous foe. Their expense is quite trifling compared with that of great ships of war; they could be multiplied indefinitely, and, no doubt, they could be carried on board other ships and be launched from them as occasion might require. But even this formidable engine, which, perhaps, is as yet only in its infancy, seems surpassed in destructiveness by the Whitehead Torpedoes, These, as described by Lord Charles Beresford, are a kind of automatic projectiles. The size is some six yards long, and of the shape of a cigar, pointed at both ends. They are made in three compartments, the head containing the explosive charge, the centre being a balance chamber which enables them to be adjusted to travel at any depth under water from one foot to thirty feet, and the third compartment consisting of an air-chamber, which contains engines, and compressed air to drive them. It will travel under water for a distance of 1,000 yards, and can be so set as to explode either on contact or after passing a given distance—in artillery language, either by a percussion or a time fuze. It "can be fired above the water; but will at once go to the depth it is set for, and then go straight to the object, no matter how fast the ship from which it is discharged is sailing, or how fast the object aimed at might be sailing or steaming. In fact, it could do everything but speak," and the hole it makes on striking is said to be 70 feet in area. It is evident that by this means a comparatively feeble ship, if only able to approach within 1,000 yards of a larger one, could discharge a deadly flight of unseen projectives at her, and at night such an attack would probably be wholly unsuspected and scarcely open to resistance. Attempts are being made to devise wire nets which may be spread around vessels at anchor, but it seems to be thought this torpedo would break through them.

DEATH OF MR. GEORGE ODGER.—It is not as a politician that we record the decease of Mr. Odger, but as a representative working man who held enlightened views as to the advantage of invention, and the necessity of amendment of the Patent Laws. He died 4th March, 1877, aged 63 years.

CHRONOLOGICAL LIST OF

APPLICATIONS FOR LETTERS PATENT.

⁂ In this list (Com. means Invention communicated from abroad.

Further information, as to the progress of these Patents by Notice to Proceed, Sealing, and Specifying, can be obtained at the Office, 21, Cockspur-street, Charing Cross.

On September 23rd.—3720 to 3729.—R. Scott. Manufacture of edgings in twist lace machines. A. P. Dupont. Machinery for cutting bottons, counters, lotos, and similar articles of bone, ivory, wood, horn, or other material.—H. Johnson. Colliery tubs.—D. Semple. Appliances for certain string musical instruments.—F. Wirth. Apparatus for mashing and grinding materials for distilleries, and for similar purposes (com.)—J. Duthie. Arrangement of windlass or paying-out and hauling-in gearing for on use on board of fishing and other boats.—C. J. De Meyer, A. Ruidant, and P. J. Mulders.—Improved composition or varnish.—H. Merryweather and C. J. W. Jakeman. Tramway locomotives, partly applicable to other steam engines.—E. T. Hughes. Improved metal drill or boring tool, and stock therefor (com.)—E. T. Hughes. Combined steam gauge and safety valve (com.)

On September 25th.—3730 3746.—W. J. Coe. Safety alarm apparatus for steam boilers and other structures where gaseous matters are liable to accumulate to an abnormal pressure.—J. B. Orr. Treatment of textile fabrics, printed or dyed with aniline black, in order to prevent what is known as "greening."—J. Shaw. Rollers for expressing liquid from textile materials, yarns, and fabrics.—J. P. Haffner. Safety-lock for coffers, furniture, apartments, and other similar applications.—L. Henry. White which is to replace white lead in its various applications.—A. M. Clark. Tools for shaving or bevelling the edges of leather (com.)—A. C. Herts. Abdominal supports (com.)—J. G. Wilson. Apparatus for extinguishing sparks in the chimneys of locomotive, portable, and other steam engines (com.)—J. Coles. Heating apparatus for the heating of water for all kind of steam engines. W. R. Lake. Apparatus for assisting persons learning to sing (com.)—G. Hunter. Stone-working apparatus.—G. H. Neumann. Machinery or apparatus for boring or drilling rocks and other hard substances (com.)—W. R. Lake. Sewing machinery (com.)—J. McKendrick and H. W. Ball. Distillation of water and in the mechanism or apparatus employed therefor.—B. Mountain and J. Mountain. Machinery or apparatus employed in the manufacture of heading, clasp, clout, or other nails and tacks.—H. Collet and J. B. Denans. Apparatus for distributing, purifying, and regulating the flow of liquids.—J. D. Dougall. Cartridges.

On September 26th.—3747 to 3758.—M. E. Bowra and A. H. A. Zeden. Manufacture of elastic materials for boots and shoes, gaiters, bands, gloves, leggings, stockings, sheets from one inch to sixty inches wide, and for other useful purposes.—C. D. Abel. Apparatus for extinguishing sparks in the chimnies, flues, or uptakes of locomotive, marine, and other steam boilers (com.)—A. Perry. Manufacture and kiln-drying of malt and other substances requiring the use of kilns, and apparatus therefor.—W. E. Gedge. Seats for vehicles (com.)—A. Heaven. Machinery for embroidering fabrics, and apparatus for driving such machines.—W. Brookes. Padlocks (com.)—J. Steel and D. Smith. Method of and apparatus for relieving the silver of tention in silver and drawing cans.—R. Donaldson and J. Taylor. Winch or windlass for hauling in fishing nets, ropes or lines, and heaving weights on board of fishing boats or other vessels.—T. G. Palmer. Machines for cancelling postage stamps, and post-marking letters and papers.—F. Wirth. Method of treating spent material from the gasworks by recovery of sulphur (com.)—R. F. Strong. Machinery for making the patent safety railway keys for securing railway rails to the chairs.—G. Murry and J. Moss. Fire escapes and ladders.

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